UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8960

July 28, 2014

Mr. George Tahu
Planetary Science Division
Science Mission Directorate
NASA Headquarters, Mail Suite 3E46
Washington, D.C. 20546-0001

RE: Draft Environmental Impact Statement (DEIS) for the Mars 2020 Mission – Tier 2; NAS-A12042-00; CEQ No.: 20140163

Dear Mr. Tahu:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject document and is commenting in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The National Aeronautics and Space Administration (NASA) is proposing to launch an expendable launch vehicle in 2020 with a large, mobile science laboratory with advanced instrumentation to continue in-depth exploration on the surface of Mars.

The DEIS presented descriptions of the proposed Mars 2020 mission, spacecraft, and candidate launch vehicles; an overview of the affected environment at or near the launch site and globally; and the potential environmental consequences associated with the proposed action and alternatives. The proposed Mars 2020 Mission builds upon the discoveries made from previous Mars missions, including the Mars Science Laboratory Rover (Curiosity) and the two Mars Exploration Rovers (Spirit and Opportunity). The DEIS evaluated 3 alternatives and the No Action alternative.

The DEIS describes three action alternatives and the No Action alternative. NASA's preferred alternative is Alternative 1 which utilizes a radioisotope system to power the Mars Rover battery. EPA has attached detailed technical comments for your consideration (See Attachment A). Overall, EPA has rated the preferred alternative in the DEIS as 'EC-1', which indicates that there are 'environmental concerns' considering the low probability of an accident involving a plutonium fuel source and that NASA provided sufficient information in the DEIS. We request that the contingency planning and emergency response coordination to address our environmental concerns be addressed in the FEIS and Record of Decision (ROD). EPA requests a copy of the Final EIS and ROD when they become available. We appreciate your coordination

with us and should you have any questions concerning these comments, please contact Mr. Larry Gissentanna at 404-562-8248. Thank you.

Sincerely,

for

Heinz J. Mueller, Chief
NEPA Program Office

Attachment

ATTACHMENT A
Detailed Technical Comments
NASA Mars 2020 Mission

Primary Issue of Concern

The primary environmental issue of concern is the potential use of a radioisotope (i.e., 10.6 lbs. of plutonium oxide) to power the Mars Rover to complete mission objectives. The DEIS provides alternatives to this alternative including the use of solar power (Alternative 2) or a combination of solar power and a light-weight radioisotope heater units (LWRHUs) (Alternative 3). The DEIS provides detailed information regarding the accident scenarios and associated risk assessments performed using the radioisotope powered system (Multi-Mission Radioisotope Thermoelectric Generator or MMRTG) under the preferred alternative (Alternative 1) as well as the other alternatives considered. The DEIS describes other radioisotopes that have been used in past NASA missions (e.g., Tables on page 2-16 and 2-19) either in scientific instrumentation or for power sources.

NASA has consulted with the Department of Energy (DOE) and in performing the radiological risk assessment using different scenarios and at different phases of the mission. The DEIS provides detailed information regarding the benefits and limitations of the different rover power systems. The greatest limitation of utilizing a solar powered system is associated with the Martian dust covering the solar panels (40% dust factor) and the extremes in climatic conditions on Mars at the different latitudes. In Table 2-11 of the DEIS, NASA provides the summary of the estimated mean radiological health consequences associated with the three alternatives. The table provides the overall probabilities for the different alternatives at different stages of the mission (i.e., Pre-launch, early launch, late launch, sub-orbital, orbital, long-term reentry). The overall probability of an accident with a release for the two radioisotope alternatives is estimated as follows: Alternative 1 – 1 in 2,600; Alternative 3 – 1 in 15,000. Alternative 2 and an instrument source accident probability is estimated to be 1 in 87. The maximum individual dose and latent cancer fatalities for the different options is also provided in this table.

The DEIS provides for the effects of plutonium on the environment in Appendix B of the DEIS. The DEIS also provides a detailed description of the components of the MMRTG including the GPHS module, GIS, related graphite components, the iridium clads, and ceramic form of the plutonium dioxide pellet. There is information on the engineering, fabrication, safety testing, and evaluation of the GPHS module and the past history involving various accident scenarios (e.g., impact from fragments, thermal energy, explosive overpressure, etc.). Appendix C provides a detailed Environmental Justice Analysis under E.O. 12898 and concludes that implementation of the proposed action would pose no significant radiological or non-radiological risk to the public, including minority and low-income groups within the potentially affected population.

EPA believes that the most important aspect to the proposed action is the radiological emergency response planning generally described on pages 2-36 and 2-37 of the DEIS. EPA requests that the action items identified for the planning be included as Record of Decision (ROD) commitments and that EPA Region 4's emergency response office be notified during any

pre-planning exercises and prior to launch to verify the response interfaces and any other coordination assistance.